

1 WHAT IS CLAIMED IS:
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3 1. A separation column comprising:
4 a separation channel; and
5 a fritless separation medium in the channel, said medium comprising a
6 porous matrix, said porous matrix comprising a metal organic photopolymer.
7

1 2. The column of claim 1, wherein the separation channel has a channel
2 wall, and the medium is attached to the channel wall and fills at least a section of the
3 channel.
4

1 3. The column of claim 1, wherein the porous matrix is homogeneous and
2 contains no chromatographic particles.
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1 3. The column of claim 1, wherein a precursor of the photopolymer
2 comprises a metal alkoxide.
3

1 4. The column of claim 4, wherein the metal alkoxide comprises a metal,
2 and the metal is selected from the group consisting of aluminum, barium, antimony,
3 calcium, chromium, copper, erbium, germanium, iron, lead, lithium, phosphorus,
4 potassium, silicon, tantalum, tin, titanium, vanadium, zinc, and zirconium.
5

1 5. The column of claim 4, wherein the metal alkoxide comprises at least
2 one photoactive group.
3

1 6. The column of claim 1, wherein the porous matrix has an affinity for
2 an analyte.
3

1 7. The column of claim 1, wherein the separation medium comprises a
2 homogeneous phase.
3

1 8. The column of claim 1, wherein the separation channel is a capillary
2 separation channel or a planar structure.
3

1 9. A separation column comprising:
2 a separation channel; and
3 a fritless separation medium in the channel, said medium comprising a
4 porous matrix, said porous matrix comprising a metal organic polymer.
5

1 10. A method of preparing a monolith in a separation column, comprising:
2 providing a separation column;
3 introducing a mixture into the column, the mixture comprising a metal
4 organic compound; and
5 irradiating the mixture, causing the mixture to form a solid, porous
6 matrix via photoinitiated polymerization, thereby forming a fritless separation
7 medium in the column.
8

1 11. The method of claim 11, wherein the porous matrix contains no
2 chromatographic particles.
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1 12. The method of claim 11, wherein the mixture comprises at least one
2 metal organic monomer, at least one porogen, and a photoinitiator.
3

1 13. The method of claim 13, wherein the porogen is selected controllably
2 to form pores in the matrix.
3

1 14. The method of claim 14, further comprising selecting a molar ratio of
2 monomer to porogen to form pores in the matrix.
3

1 15. The method of claim 11, wherein the irradiating comprises irradiating
2 the mixture with visible or ultraviolet light.
3

1 16. The method of claim 11, further comprising introducing an organic
2 solvent into the column, the column including the solid, porous matrix.
3

1 17. The method of claim 11, wherein the providing comprises providing a
2 capillary or a planar structure.
3

1 18. A method of separating a sample of analytes, comprising:
2 providing a separation column comprising a separation channel and a
3 fritless separation medium in the channel, said medium comprising a porous matrix,
4 said porous matrix comprising a metal organic photopolymer;
5 introducing a sample of analytes carried in a solution through the
6 column, wherein the medium concentrates the analytes on the column; and
7 causing a solution to flow through the column, thereby separating and
8 eluting the analytes.

1 19. The method of claim 19, wherein the introducing comprises applying a
2 voltage or a pressure to the column.

1 20. The method of claim 19, wherein the introducing comprises
2 introducing a sample of analytes carried in a first solution through the column, and the
3 causing comprises causing a second solution to flow through the column, wherein the
4 first solution is the same solution as the second solution.

1 21. The method of claim 19, wherein the introducing comprises
2 introducing a sample of analytes carried in a first solution through the column,
3 wherein the first solution comprises an eluting solvent, and the causing comprises
4 causing a second solution to flow through the column, wherein the second solution
5 comprising the eluting solvent, and a concentration of the eluting solvent in the first
6 solution is less than a concentration of the eluting solvent in the second solution.

1 22. The method of claim 22, wherein the introducing comprises
2 introducing a sample of analytes having an injection plug length greater than a length
3 of the column.

1 23. The method of claim 19, wherein the introducing comprises causing
2 sample stacking.

1 24. The method of claim 19, wherein the providing comprises providing a
2 separation medium comprising a porous matrix without chromatographic particles.

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- 1 25. The method of claim 19, wherein the providing comprises providing a
- 2 separation column comprising a capillary or a planar structure.
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